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ABSTRACT

The increasing availability and usefulness of computers in the classroom has made computer literacy not a luxury but a necessity for most schools. Recent studies have shown that teachers have not been adequately trained to use such educational technology. However, several training models can be used by colleges of education to meet this need. A course in computer literacy, such as "Introduction to Computers" can be added to the curriculum. Many colleges of education have restructured an audiovisual training course or added an educational technology course. Another method is to integrate the educational uses of technology throughout the courses in the curriculum. A state inservice or certification requirement may be the impetus for needs-based courses in minimum technology competencies. An integrated followup approach could begin in preservice training and continue through a university-collaborated inservice program. In planning to use these models, three factors must be considered: the future needs of the users; the applications of computers to educational settings; and the impact of technology on school settings. (FG)

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The Role of Technology in Teacher Education: Preparation for the Twenty-First Century Classroom

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During the past decade, technology has offered to the education establishment an opportunity to create a renaissance, or rebirth, of learning experiences through new types of delivery mechanisms that can act as aides in increasing both efficiency and accountability in instruction. Many schools, from the elementary through the collegiate level, have been quick to take advantage of these new systems, focusing particularly on communication and information retrieval networks.

The gains made in speed, lowered costs and decreasing size have acted as magnets in attracting educators to broader applications of technology. Used directly by teachers as an adjunct to instruction, as a tool in laboratory work, in drill and practice sequences, or in individualization of instruction, technology, and in particular microcomputer technology, is fast becoming not a luxury but a necessity to most schools. Consider that, in Chamber's and Bork's 1980 study of computer usage in elementary and secondary schools, out of 607 public school districts returning survey forms:

1. 90% used computers for either instructional or administrative purposes. By 1985 this number was expected to rise to 95%.
2. 74% of the districts included the use of computers among their instructional strategies. It was anticipated that this would increase to 87% by 1985.
3. 54% currently used computer assisted learning (CAL) in one form or another.
4. Most computer assisted learning was heavily concentrated at the secondary level. Mathematics, Natural Sciences, Business and Language Arts show the largest usage.

5. Computer assisted learning was expected to expand to other high school fields, including the Social Sciences, while extensive use at the elementary level was also foreseen.
6. After funding, the only factor impeding wider usage of the computer as a learning tool is the lack of knowledge about computer technology and its applications by administrators and faculty.

Financial limitations should not be overly exaggerated as a detriment in the spread of technology as costs are decreasing rapidly. For example, the $3,000 micro-computer system of today is comparable to the $200,000 computer system of thirty years ago (Moursund, 1980). Concern over costs, especially in an era of economic uncertainty, will continue to inhibit many segments of our schools from incorporating technology in their curriculums. Eventually, however, the sheer necessity to train students in the use of micro-technology for occupational, as well as academic purposes, will force those few schools not now using this kind of equipment to expand their curriculums in these areas.

While advancement in hardware has brought down the cost of machinery, there is increasing concern over the lack of training, either at the pre-service or inservice levels, for teachers who might incorporate technology in their classrooms. Most teachers in content areas outside science and mathematics have little background in computer literacy, technology usage or the interfacing of technological and, in particular, computer instruction with regular classroom activities. This has led to avoiding the use of technology or at best, misusing it. As Kelman (1982) pointedly states "...most teachers are fearful, suspicious, and rightfully skeptical about the use of computers in schools." Without adequate training and understanding there is little likelihood of

most teachers augmenting instruction with technology no matter how attractive its usage may seem. It is in this important area of training and technological literacy that units in colleges and universities charged with pre and inservice teacher training need to display leadership roles. Unfortunately, this has not taken place at the same pace as the placement of hardware within schools and classrooms.

Colleges of Education have remained woefully behind other academic units in preparing their graduates in technological and computer training. For example, in 1976 only 6.8% of a sample of 175 Colleges of Education offered a comprehensive program of computer education as part of their teacher training curriculum (Baker, 1976). In a more recent survey, 94.4% of student teachers (out of a sample of 227) felt unqualified to deal with computer literacy topics in their classroom (Stevens,1980). Seventy-three percent of the group also felt that "teacher preparation programs should include instructional applications of computer as part of the preservice curriculum" (Stevens, 1980).

The situation for the teacher already in the classroom is equally disheartening. As school districts rush to buy computers few offer teachers the necessary inservice training to make the technology viable in classrooms. Most rely on a core of math, science, and computer science teachers to maintain existing technological systems and gain information about new ones. With increased usage of micro-computers, video-disc systems, and interactive cable television systems, technological training and curriculum for both preservice and inservice education programs in technology must be developed and increased.

Training Models

Several types of training models have been suggested for teacher educators. They range from Aiken and Braun's (1980) proposal that a

series of courses and programs on computers be developed and provided for students training to become teachers, to others such as one Henderson (1978) relates that would require all pre-service, inservice teachers and administrators to complete a minimum of two courses in computer science as a requirement for teacher certification. Additional courses on the use of computer materials for elementary and secondary pre-service teachers and courses on computer operations in schools for administrators would complete this proposed training sequence.

Some foreign educators such as Hallworth and Brebmén, Canadians, (1980), would have the central, or federal, government provide support for research and demonstration projects in technology. They also favor a requirement that would make all new teachers knowledgeable in the use of computers in education and have all teachers, new and continuing, take course work in computer literacy.

In Western Europe both France and West Germany have used the training of a cadre of teachers to train other teachers (the Triple T model) to increase technological literacy. Every year since 1976 a hundred voluntary teachers of all disciplines have been trained by the French Ministry of Education in computer literacy and its applications. The central government has also purchased over 1,200 micro-computers and will begin to place them in secondary schools this next year for inservice purposes to augment and complete this training (Hebenstreit, 1982). The situation in West Germany is analogous to France. Large governmental purchases of micro-technology have provided the impetus for technological educational opportunities for teachers. In West Germany the National Office for Data Processing acts as the delivery mechanism for training (Keil, 1982).

Given present economic parameters, a massive movement by the federal government to provide teachers, at either pre or inservice levels with training in the use of technology is not foreseeable. In fact, any type of governmental assistance in this area will probably not be forthcoming. Instead, the burden of both training costs and services will, by necessity, be taken up by individual state and university programs. Within these constrictions there are a variety of technological training models that might be considered as Colleges of Education respond to the needs in this area.

(1) The General Education Course Work Model

This model might be labeled the "let's add another course to graduation requirements" model. Usually taught by faculty in math or computer science, the classes in this model, sometimes called Computer Literacy of Introduction to Computers, are lecture discussion type and may have little in the way of direct hardware usage in them. While they may include some discussion on technological applications they usually do not relate how a perspective teacher might apply technology in their classroom. This model is a "quick-fix" effort and will not, in the long term, aide in making educators technologically literate.

(2) The Educational Technology Course Work Model

Many Colleges of Education, in an effort to meet computer and technological training requests from public school systems have either added a course in Educational Technology or have restructured their old audio-visual training courses to include a component on computers. While this model does provide students with some ideas on how to use technology and often includes hands-on work with computers and video-disk systems, many of its components are not reinforced in other classes taken by education students. In other words, the uses of technology are often limited to this one class. Students often view this type of training in a compartmentalized manner with no tie-in to other parts of the curriculum.

(3) The Integration/Application Model

In this model, the educational uses of technology and its impacts are spread out throughout the entire teacher education program. Instead of concentrating training and application in one semester, or quarter, this responsibility is shared amongst the entire curriculum structure. Mankato State University in Minnesota uses this model quite successfully. Computer applications are used in courses such as: Imporvement of Instruction, Secondary Curriculum, and Seminar in Early Childhood (Hunter, 1978).

(4) Inservice/Certification Model

As political pressures cause states to require teachers to display technological competency this model will become popular. Often called the teach me about it in two days model, this type of training historically has suffered from a lack of teacher involvement and input. Should it be used in the same manner with technology as is has been with other subject areas, teachers will not display an overly zealous acceptance of this kind of innovation.

(5) Technology Follow-Up Model

This model uses the same approach as the integration/application motiff in that it seeks to integrate technological literacy and applications throughout the curriculum. It begins in pre-service teacher education courses, continues throughout the student-teaching experience and continues, again, on an inservice basis throughout the teacher's career. A partnership between university and public school districts in continuing education is part of this model. Using both collegiate and district computer personnel to train personnel and write curriculum for technology, this program provides for a continuous upgrading of technological applications at all educational levels.

While each university might use one or a combination of these models, all will have to concern themselves with three basic issues:

1. What do people in schools need to know about computers?
2. How does one apply computer technology in educational settings?
3. What will be the impact of technology on school settings?

What do people in schools need to know about computers?

In recent years the term computer literacy has been bandied about so much that is has, in a sense, become so misinterpreted as to lose the elements necessary to make it meaningful. Being technologically literate is dependent on the population being served, the needs of that population via the equipment they will be using or working with, and the long term goals of the institution providing the literacy training. Technological training must also be future oriented. That is, it needs to include within it the idea that society and technology can and will change. Adaptability needs to be stressed throughout. There are specific components that also need to be stressed. These are:

a. Terminology - Nothing turns teachers off more than jargonnesse. Explanations of terms such as RAM, ROM, and DOS need to be presented succinctly and with direct application to the system being used.

b. Mechanical Operation - How does one turn the computer on? What are the hardware components? What happens if the computer breaks down? Who repairs the machinery? All these may seem trivial, but they form part of what might be termed the "fear factor" in introducing computers to those who don't have a technical background.

c. Software - After becoming familiar with the hardware, most users

are eager to try a program. They are also very interested in selecting materials for use in their classrooms. For these reasons a wide variety of commercially made software should be available to the neophyte computer user. Later on an evaluation scheme for choosing software, based on current and future curriculum needs, should be formulated.

d. Programming - Parallel to an explanation of computer terminology, lessons in computer programming should be presented. Most teachers realize that like other instructional tools, the computer can best be used if it is adapted to their specific classroom needs. They will want to know how to prepare lessons for their students and how to use a program language for the system they're using.

How does one apply computer technology in educational settings?

The use of a computer as part of a series of instructional interactions implies that one has recognized a certain segment of the curriculum amenable to computerization. In other words there is a direct purpose for using the technology. Too often school officials, and the public at large, have viewed the introduction of innovation as a panacea for all problems at hand. Unless there is an integrative pattern for the use of computer technology in an educational setting, it will either fail or else, at best, be viewed as something that is an extra frill to be used when "there is time available."

Applying a computer system to the curriculum also indicates a knowledge of the subject at hand. The patterns of the subject need to be considered as well as the way in which the students and system will be evaluated upon completion of their tasks. Are there off-line materials that reinforce knowledge gained at the machines? Is the management of the curriculum clearly defined? Do the remedial and extended branches of the program

provide learning experiences for all the children in the classroom? Complete answers need to be provided to these questions before one can apply a computer to a classroom setting.

What will be the impact of technology on school settings?

Merely providing classes on programming and using a computer video-disc system in classroom setting is not enough for today's student. These youngsters need to understand how these machines effect their lives both now, and in the future.

Who will control the information the technology provides? How will it be used? Should there be limits on its use? How much of this knowledge should remain private or shared with the society? All these issues must be dealt with else these systems will overwhelm those we are training to use them. There is a strong need to provide students with an arena where they can begin to discuss and decide these issues.

We alsc need to teach futurism when talking about technology. Changes in work and study patterns have to be looked at. Tie-ins with television, lasers and other technology need to be provided. With these issues the notion of a whole new set of careers could also be introduced.

Some Concluding Thoughts

Technological advancements offer to Colleges of Education new opportunities to take on leadership roles in training, literacy development and curriculum planning for the twenty-first century classroom. The manner in which they respond to this challenge will help set the tone of the micro-technological revolution. If positive, and applied, technological literacy training can be a strong force in reshaping and redirecting learning paradigms. However, as Kelman (1982) states: "Teachers need to learn how computers can help them, without displacing them or making their lives more difficult. Such training

must be widespread and it must provide the depth needed for teachers to implement what they learn." While directing his remarks to micro-computer training, this same statement can be applied to all forms of technological education. The hardware for classroom use is available, the time to train educators to use it properly is rapidly diminishing.

Note:

[1]This section is adapted from a forthcoming article by the author entitled "Education and Technology - Some Unresolved Issues" that will appear in Educational Technology.

REFERENCES

Aiken, R.M. and Braun, L. "Into the 80's with Microcomputer Based Learning," Computer, Volume 13, No. 7, 1980, 11-16

Baker, J. Computers in the Curriculum. Phi Delta Kappa, Bloomington, Indiana, 1976

Chambers, J.A. and Bork, A. Computer Assisted Learning in U.S. Secondary/ Elementary Schools. Center for Information Processing, California State University, Fresno, CA. Research Report No. 80-03, 1980.

Diem, R. A. "Education and Technology-Some Unresolved Issues," Educational Technology (in press)

Hallworth, H.J. and Brebmen, A. Computer Assisted Instruction in Schools: Achievements, Present Developments and Projections for the Future. Calgary: Faculty of Education Computer Applications Unit, 1980

Hebenstreit, R. "Teacher Training for Computer Assisted Learning In France," T.H.E. Journal, Volume 9, Number 1, January, 1982, 50-52

Henderson, D.C. "Educational Uses of the Computer: Implications for Teacher/ Administrator Training," Educational Technology, Volume 18, Number 8, August, 1978, 41-42

Hunter, B. Academic Computing at Mankato State University-A Case Study, Human Resources Research Organization, Alexandria, Virginia, 1978

Keil, K.A., "The General Introduction of Computers Into Bavarian Schools," T.H.E. Journal, Volume 9, Number 1, January, 1982, 61-64

Kelman, P. "What If They Gave a Computer Revolution and Nobody Came?" Classroom Computer News, Volume 2, Number 3, January/February, 1982, 10 and 54-55

Moursund, D. "School Administrator's Introduction to Instructional Use of Computers," The Computing Teacher, Volume 8, Number 2, December, 1980, 8-22

Stevens, D. J. "How Educators Perceive Computers in the Classroom," Association for Educational Data Systems Journal, Volume 13, No. 3, Spring, 1980, 221-223